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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/843,834	04/30/2001	Ronny Kimmel	10001200-1	1010

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EXAMINER	
COUSO, YON JUNG	
ART UNIT	**PAPER NUMBER**
2625	

DATE MAILED: 11/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Q3

Office Action Summary	Application No.	Applicant(s)	
	09/843,834	KIMMEL ET AL.	
	Examiner	Art Unit	
	Yon Couso	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-11 and 13-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, 4-11, 13-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. Applicant's arguments filed July 19, 2004 have been fully considered but they are not persuasive.

a. The applicant argues that the Kimmel does not teach calculating a gradient of a penalty functional includes a weight function that obtains values close to the algorithm of the illumination of the image over most parts of the image. The examiner disagrees. Kimmel teaches calculating a gradient of a penalty functional includes a weight function that obtains values close to the algorithm of the illumination of the image over most parts of the image in the equation : $[I] = \int_{\Omega} \{ w_1 (\nabla s) |\nabla I|^2 + \alpha (I - s) + \beta w_2 (\nabla s) |\nabla I - \nabla s|^2 \} dxdy$ (page 11, lines 1-4).

b. The applicant argues that the Kimmel does not teach an iterative algorithm that processes each of the one or more resolution layers, wherein the iterative algorithm, for each of one or more iterations, calculates a gradient of a penalty functional, wherein the penalty functional includes a weight function that obtains values close to the logarithm of L over most parts of the image. The examiner disagrees. Kimmel teaches an iterative algorithm that processes each of the one or more resolution layers, wherein the iterative algorithm, for each of one or more iterations, calculates a gradient of a penalty functional, wherein the penalty functional includes a weight function that obtains values close to the logarithm of L over most parts of the image (pages 10-11 under 3. Main Loop and $[I] = \int_{\Omega} \{ w_1 (\nabla s) |\nabla I|^2 + \alpha (I - s) + \beta w_2 (\nabla s) |\nabla I - \nabla s|^2 \} dxdy$ at page 11, lines 1-4).

c. The applicant argues that the Kimmel does not teach processing the resolution layers using an iterative algorithm that processes each of the one or more resolution

layers, wherein the iterative algorithm, for each of one or more iterations, calculates a gradient of a penalty functional, wherein the penalty functional includes a weight function that obtains values close to the logarithm of L over most parts of the image. The examiner disagrees. Kimmel teaches processing the resolution layers using an iterative algorithm that processes each of the one or more resolution layers, wherein the iterative algorithm, for each of one or more iterations, calculates a gradient of a penalty functional, wherein the penalty functional includes a weight function that obtains values close to the logarithm of L over most parts of the image (pages 10-11 under 3. Main Loop and $[I] = \int_{\Omega} \{ w_1 (\nabla s) |\nabla I|^2 + \alpha (I - s) + \beta w_2 (\nabla s) |\nabla I - \nabla s|^2 \}$ dxdy at page 11, lines 1-4).

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4-11, 13-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Kimmel et al "A Variational Framework for Retinex (XP-002243109)".

As per claims 1 and 10, Kimmel teaches an image enhancement method, comprising: capturing an image; constructing a multi-resolution structure comprising one or more resolution layers (page 9, under 3.2.2. Multi-Resolution); processing each resolution layer using an iterative algorithm having at least one iteration (pages 10-11 under 3. Main Loop); calculating a gradient of a penalty functional includes a weight function that obtains values close to the algorithm of the illumination of the image over

most parts of the image in the equation : $[I] = \int_{\Omega} \{ w_1 (\nabla s) |\nabla I|^2 + \alpha (I - s) + \beta w_2 (\nabla s) |\nabla I - \nabla s|^2 \} dxdy$ (page 11, lines 1-4); projecting each processed resolution layer to a subsequent resolution layer (page 10, step (d) under 3. Main Loop); up-calling each projected resolution layer to the subsequent resolution layer (page 11, under 4. Update the next resolution layer); and using the projected resolution layers to estimate an illumination image (I, illumination image calculated).

As per claims 2 and 11, Kimmel teaches, for each of one or more iterations, computing an optimal line-search step size (pages 8-9 under 3.2.1 Projected Normalized Steepest Descent).

As per claims 4, 13, and 21, Kimmel teaches that the penalty functional is given by:

$[I] = \int_{\Omega} \{ w_1 (\nabla s) |\nabla I|^2 + \alpha (I - s) + \beta w_2 (\nabla s) |\nabla I - \nabla s|^2 \} dxdy$ where w_1 and w_2 are non-linear functions of the gradient (page 11, lines 1-4).

As per claims 5 and 14, Kimmel teaches the iterative algorithm is a Projected Normalized Steepest Descent algorithm (pages 8-9 under 3.2.1 Projected Normalized Steepest Descent).

As per claims 6 and 15, Kimmel teaches the iterative algorithm is a Steepest Descent algorithm (pages 8-9 under 3.2.1 Projected Normalized Steepest Descent).

As per claims 7 and 16, Kimmel teaches a set of constraints comprises a constraint that the illumination is greater than the image intensity, L>S ($I \geq s$ in Kimmel meet the requirement of L>S).

As per claims 8 and 17, Kimmel teaches applying penalty terms, the penalty terms, comprising: that the illumination is spatially smooth; that the reflectance is maximized; and that the reflectance is piece-wise smooth (pages 8-9 under 3.2.1 Projected Normalized Steepest Descent).

As per claims 9 and 18, Kimmel teaches computing the reflectance image based on the captured image and the estimated illumination image; computing a gamma correction factor; applying the gamma correction factor to the estimated illumination image; and multiplying the gamma-corrected illumination image and the reflectance image, thereby producing a corrected image (page 13, figure 3).

As per claim 19, Kimmel teaches a method for enhancing an image S, the image S comprising a reflectance R and an illumination L (page 2, under 1. Introduction lines 1-7), the method comprising: constructing a multi-resolution image structure having one or more resolution layers (page 9, under 3.2.2. Multi-Resolution); processing the resolution layers using an iterative algorithm (pages 10-11 under 3. Main Loop), wherein the iterative algorithm that processes each of the one or more resolution layers, wherein the iterative algorithm, for each of one or more iterations, calculates a gradient of a penalty functional, wherein the penalty functional includes a weight function that obtains values close to the logarithm of L over most parts of the image (pages 10-11 under 3. Main Loop and $[I] = \int_{\Omega} \{ w_1 (\nabla s) |\nabla I|^2 + \alpha (I - s) + \beta w_2 (\nabla s) |\nabla I - \nabla s|^2 \}$ dxdy at page 11, lines 1-4); projecting the processed resolution layers onto a set of constraints, the set of constraints comprising boundary conditions and that L>S (pages 10-11 under 3.

Main Loop and I ≥ s in Kimmel meet the requirement of L>S) and using the projected resolution layers to estimate an illumination image (I, illumination image calculated).

As per claim 20, Kimmel teaches that the image S is a RGB domain color image, the method further comprising, mapping colors R, G, B of the image S into a luminance/chrominance color space, applying a correction factor to a luminance Layer, and mapping the luminance/chrominance colors back to the RGB domain (page 12, under 4. Color Images).

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yon Couso whose telephone number is (703) 305-4779. The examiner can normally be reached on Monday through Friday from 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta, can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

YJC

October 28, 2004

VON J. COUSO
PRIMARY EXAMINER